

# *Gulf Cooperation Council*

## EDICT OF GOVERNMENT

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GSO 149 (2008) (English): Unbottled drinking water  
(Draft Standard)



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# **GCC STANDARDIZATION ORGANIZATION (GSO)**

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Unbottled drinking water

Prepared by  
The Technical Gulf Committee for Food and Agricultural Product Standards

This document is a draft for a Gulf standard and it is being circulated to solicit comments and views. It is therefore liable to change and alteration and should not be referred to as a Gulf Standard until approved by the Board of GCC.

ICS: 67.13.06

## Foreword

The Standardization Organization for GCC (GSO) is a regional organization which consists of the national standard bodies of GCC Member States.

One of the GSO's main functions is to issue Gulf Standards/Technical Regulations through specialized technical committees (TCs).

Through the technical program of Committee TC No. (5) "Technical Gulf Committee for Food and Agricultural Product Standards", the GSO has updated GSO Standard No. **149/2000** "Unbottled drinking water". The draft standard has been prepared by (The State of Qatar).

This standard was approved as a Gulf Technical Regulation by the GSO Board of Directors at its meeting No...../.....held on // H, / /

The approved standard will replace and supersede Standard No. **(149/2000)**.

## **Unbottled drinking water**

### **1. Area and scope of application**

This Gulf Standard applies to unbottled drinking water.

### **2. Complementary resources**

- 2.1 **GSO 9** “Passports of Packed Food Products”.
- 2.2 **GSO 111** “Drinking and Mineral Water Testing Methods – Part 1: Sampling”.
- 2.3 **GSO 112** “Drinking and Mineral Water Testing Methods – Part 2: Assessment of Natural Properties”.
- 2.4 **GSO 378** “Drinking and Mineral Water Testing Methods – Part 3: Routine Microbiological Tests”.
- 2.5 **GSO 818** “Drinking and Mineral Water Testing Methods – Part 15: Non-routine Microbiological Tests”.
- 2.6 Accredited Gulf Standards pertaining to “Chemical Testing Methods of Drinking and Mineral Water”.

### **3. Definitions**

#### **3.1 Unbottled drinking water:**

Water fit for human consumption supplied to consumers by means of a public or limited distribution network, from wells, springs or any other source of surface water used for drinking, which is subject to all specifications set forth in this Standard.

- 3.2 **Public water distribution network:** a network supplying consumers with water fit for human consumption, which has more than fifteen connections and includes collection, treatment, storage and distribution of drinking water from source to consumers.
- 3.3 **Limited distribution network:** a network for supplying consumers with water fit for human consumption which has fewer than fifteen connections.
- 3.4 **Artesian water:** water obtained from a well built in an underground water reservoir, in which the water surface level is slightly above the surface level of the underground water reservoir. Artesian water is drawn by means of external force supported by natural underground pressure, in so far as such measures do not alter physical properties, composition or quality of the water.

- 3.5 Well water: water obtained from an opening which has been drilled or dug or constructed in any other way in the ground and which reaches the underground layer containing the water.
- 3.6 Spring water: water flowing naturally from an underground crack to the ground surface, which is collected only at the spring or through the crack which reaches the underground layer feeding the spring. This requires the existence of a natural force making the water flow to the surface through the natural opening. It is also necessary to mark the spring site.
- 3.7 Surface water: rainwater collected in valleys or water dams or in water tanks or reservoirs, used for drinking.
- 3.8 Water source: source from which water is obtained, whether an Artesian or dug well or a spring or a public or private water distribution system or any other source containing water fit for human consumption.

#### **4. Treatment procedures:**

- 4.1 A water source shall be accredited by competent official authorities after the completion of surveys and analyses to confirm that it is fit for use.
- 4.2 The water treatment procedure, whether chemical, physical, thermal, separate or in combination with others, shall be capable of destroying microbes and the treated unbottled drinking water shall be in conformity with organic and microbiological properties defined in Sections 5.8 and 5.9.
- 4.3 Free residual chlorine in unbottled drinking water shall be sufficient to kill all microbes in it but may not exceed 0.5 ppm after staying at least for 30 minutes at a pH value of less than 5.
- 4.5 The chlorine content shall be increased in case of epidemics or in special circumstances upon a decision by the Ministry of Health or of competent authorities.

#### **5. Properties**

Unbottled drinking water shall have the following properties:

- 5.1 Quality-related properties:
  - 5.2.1 Drinking water may not contain any substances affecting its colour, taste, odour or appearance. It shall also be totally free of any extraneous substances or flaws perceptible with the naked eye, such as soil, dust, threads, hair or other flaws.
  - 5.2.2 The pH value of unbottled drinking water shall range between 6.5 and 8.
  - 5.2.3 The content of solid substances soluble in unbottled drinking water shall range between 100 and 1000 ppm.

- 5.2 Permitted levels of chemical components affecting health in drinking water are shown in Tables 1, 2, 3, 4, 5 and 6.

**Table 1**  
**Chemical components**

Component	Maximum level(in ppm)	Comments
Arsenic	0.01	total chromium  This content affects the appearance, taste and odour of water
Barium	0.7	
Boron	0.5	
Fluoride	1.5	
Chromium	0.05	
Manganese	0.4	
Molybdenum	0.07	
Selenium	0.01	
Iodine	0.015	

- 1) The minimum concentration of fluoride added to unbottled drinking water according to the daily atmospheric temperature shall be calculated as follows:

$$\text{Fluoride} = \frac{0.34}{d}$$

where:

$$d = 0.038 + [0.0062 \times (\text{daily atmospheric temperature in centigrade} \times \frac{9}{5} + 32)]$$

**Table 2**  
**Chemical components from industrial sources and human household waste**

Component	Maximum level	Comments
<b>Inorganic components:</b>	<b>ppm</b>	
Cadmium	0.003	Total organic and inorganic mercury
Cyanide	0.07	
Mercury	0.001	
<b>Organic components</b>	<b>µg/l</b>	<b>Comments</b>
Benzene	10	
Carbon tetrachloride	4	
1,2 -Di(2-ethylhexyl) phthalate	8	

1,4 -Dichlorobenzene	1000	
1,2 -Dichloroethane	300	
1,1-Dichloroethylene -1.1	30	
1,2-Dichloroethylene	50	
Dichloromethane	20	
4,1-Dioxin	50	
EDTA	600	Used as free acid
Ethylbenzene	300	
Hexachlorobutadiene	0.6	
Yacetid acid	200	
Pentachlorovinyl	9	
Styrene	20	
Tetrachloroethane	40	
Toluene	700	
Trichloroethane	20	
Zeoline	500	

**Table 3**  
**Chemical components from agricultural activities**

<b>Component</b>	<b>Maximum level</b>	<b>Comments</b>
<b>Chemical components</b>	<b>ppm</b>	
Nitrate (NO <sub>3</sub> )	50	Short-term exposure
Nitrate (NO <sub>2</sub> )	3	Short-term exposure
Nitrate (NO <sub>2</sub> )	0.2	Long-term exposure
Residual agricultural insecticides	µg/l	Comments
Alachlor	20	
Dicarb	10	Applies to dicarb sulfoxide and dicarb sulfone
Aldrine and dieldrine	0.03	
Atrazine	2	
Carbofuran	7	
Chlordane	0.2	
Chlorotoluron	30	



Sianazin	0.6	
2,3 Dichlorophenox-yacetic acid	30	
2,4 – DB	90	
2,1 Dibromo-3-chloropropane	1	
2,1 Dibromoethane	0.4	
2.1 Dichloropropane	40	
3,1 Dichloropropane	20	
Dichlorobrob	100	
Dimethoate	6	
Andrine	0.6	
Phenobrob	9	
Isoproturon	9	
Lindane	2	
MCBA	2	
Microbrob	10	
Metoxychlor	20	
Metolachlor	10	
Molinate	6	
Pendimethaline	20	
Simazine	2	
4,2,5 T	9	
Terbuthylazine	7	
Trifluoraline	20	

**Table 4**  
**Chemical components used in treatment of drinking water and related components**

Component	Maximum level	Comments
<b>Purification substances</b>	<b>ppm</b>	
Chlorine	5	To achieve purification effects, the residual free chlorine concentration must reach $\leq 0.5$ ppm after 30 minutes of contact at pH >8
Monochloramine	3	
Derivatives of purification substances	$\mu\text{g/l}$	Comments

Bromate	10	
Dichloromethane bromate	60	
Bromoform	100	
Chlorite	700	
Chlorate	700	
Chloroform	300	
Cyanogen chloride	70	
Dibromoacetonitrile	70	
Dibromochloromethane	100	
Dichloroacetate	50	
Dichloroacetonitrile	20	
Monochloroacetate	20	
Trichloroacetate	200	
4,2 – 6 Trichlorophenol	200	
Trihalomethane	1	
<b>Contaminants from treatment chemicals</b>	<b>µg/l</b>	<b>Comments</b>
Acrylamide	0.5	
Epichlorohydrin	0.4	
<b>Contaminants from pipes and equipment</b>	<b>µg/l</b>	<b>Comments</b>
Antimony	20	
Benzo [alpha] benzene	0.7	
Copper	1000	
Lead	10	
Nickel	70	
Vinyl chloride	0.3	

**Table 5**  
**Residues of insecticides used for public health purposes**

<b>Residues of insecticides used for public health purposes</b>	<b>µg/l</b>	<b>Comments</b>
Chlorpirifos	30	
DDT and substitutes	1	
Permethrin	300	
Pyriproxyfen	300	

**Table 6**  
**Toxic substances**

<b>Toxic substance</b>	<b>µg/l</b>
Micrositin LR	1

### 5.3 Radiation properties

5.3.1 The concentration of the radiation activity of radionuclides in drinking water must be in conformity with Table 7 and radionuclide components must be in conformity with Table 8.

**Table 7: Radionuclides**

<b>Radionuclide</b>	<b>Bq/l</b>	<b>Radionuclide</b>	<b>Bq/l</b>	<b>Radionuclide</b>	<b>Bq/l</b>
Hydrogen 3	10000	Cobalt 58	100	Radium 224	1
Beryllium 7	10000	Cobalt 60	100	Radium 225	1
Carbon 14	100	Nickel 59	1000	Radium 226	1
Sodium 22	100	Nickel 63	1000	Radium 228	0.1
Phosphorus 32	100	Zinc 65	100	Molybdenum 93	100
Phosphorus 33	1000	Arsenic 73	1000	Molybdenum 99	100
Sulphur 35	100	Arsenic 74	100	Technetium 96	100
Chloride 36	100	Arsenic 76	100	Technetium 97	1000
Cadmium 45	100	Arsenic 77	1000	Technetium 99	100
Cadmium 47	100	Selenium 75	100	Ruthenium 97	1000
Scandium 46	100	Brome 82	100	Ruthenium 103	100
Scandium 47	100	Rubidium 86	100	Ruthenium 106	10
Scandium 48	100	Strontium 85	100	Radium 105	1000
Vanadium 48	100	Strontium 89	100	Palladium 103	1000
Chromium 51	10000	Strontium 90	10	Silver 105	100
Manganese 52	100	Yttrium 90	100	Silver 110	100
Manganese 53	10000	Yttrium 91	100	Silver 111	100
Manganese 54	100	Zirconium 93	100	Cadmium 109	100
Iron 55	1000	Zirconium 95	100	Cadmium 110	100
Iron 59	100	Niobium 93	1000	Indrium 111	1000
Cobalt 56	100	Niobium 94	100	Indrium 114	100
Cobalt 57	100	Niobium 95	100		
Tin 113	100	Uranium 237	100	Osmium 191	100
Tin 125	100	21 Uranium 238	10	Osmium 193	100
Antimony 122	100	Lanthanum 140	100	Iridium 190	100
Antimony 124	100	Sirium 139	1000	Iridium 192	100
Antimony 125	100	Sirium 141	100	Platinum 191	1000
Tellurium 123	100	Sirium 143	100	Platinum 193	1000
Tellurium 127	1000	Sirium 144	10	Gold 198	100
Tellurium 129	1000	Niobium 147	100	Gold 199	1000
Tellurium 131	1000	Promethium 147	1000	Mercury 197	1000
Tellurium 132	100	Promethium 149	100	Mercury 203	100
Iodine 125	10	Samarium 151	1000	Thallium 200	1000
Iodine 126	10	Samarium 153	100	Thallium 201	1000
Iodine 129	1000	Erbium 152	100	Thallium 202	1000
Iodine 131	10	Erbium 154	100	Thallium 204	100
Strontium 129	1000	Erbium 155	1000	Lead 203	1000

Strontium 131	1000	Gadolinium 153	1000	Bismuth 206	100
Strontium 132	100	Terbium 160	100	Bismuth 207	100
Strontium 134	10	Erbium 169	1000	Bismuth 210	100
Strontium 135	100	Thulium 171	1000	Lead 210	0.1
Strontium 136	100	Ytterbium 175 <sup>1</sup>	1000	Polonium 210	0.1
Strontium 137	10	Tantalum 182	100	Radium 223	1
Barium 131	1000	Tungsten 181	1000	Chromium 242	10
Barium 140	100	Tungsten 185	1000	Chromium 243	1
Uranium 235	1	Rhenium 186	100	Chromium 244	1
Uranium 236	1	Osmium 185	100	Chromium 245	1
Thorium 227	10	Uranium 234	10	Chromium 246	1
Thorium 228	1	Niobium 237	1	Chromium 247	1
Thorium 229	0.1	Niobium 239	100	Chromium 248	0.1
Thorium 230	1	Plutonium 236	1	Berkelium <sup>2</sup> 249	100
Thorium 231	1000	Plutonium 237	1000	Californium 246	100
Thorium 232	1	Plutonium 238	1	Californium 247	10
Thorium 234	100	Plutonium 239	1	Californium 249	1
Protactinium 230	100	Plutonium 240	1	Californium 250	1
Protactinium 231	0.1	Plutonium 241	10	Californium 251	1
Protactinium 233	100	Plutonium 242	1	Californium 252	1
Uranium 230	1	Plutonium 244	1	Californium 253	100
Uranium 231	1000	Americium 241	1	Californium 254	1
Uranium 232	1	Americium 242	1000	Einsteinium 253	10
Uranium 233	1	Americium 243	1	Einsteinium 254	10

Table 8  
Radioactive components in drinking water

Radiation	Maximum limit (Bq/l)
Alpha radiation - total	0.5
Beta radiation - total	1

If the total alpha and beta radiation exceeds the limits set out in Table 8, an examination may be carried out to define each radionuclide and its radiation and to compare the results according to Table 7 with the following equation:

$$\sum \frac{\text{Radiation value of the relevant radionuclide in drinking water}}{\text{Maximum radiation value of such radionuclide}}$$

If the total radiation dose is equal to  $\geq 0.1$  millisieverts per year, the drinking water shall be fit for consumption; if the total radiation dose is equal to  $< 0.1$  millisieverts per year, it is possible to check whether there anything exists that would justify taking corrective measures to reduce such dose.

<sup>1</sup> Note from the DGT: The freelance translator who produced this translation pointed out that there seemed to be a typing error in this part of the Arabic original.

<sup>2</sup> Note from the DGT: The freelance translator who produced this translation pointed out that there seemed to be a typing error in this part of the Arabic original.

- 5.3.1 The concentration of the radiation activity of radon in drinking water may not exceed 100 bq/l.

5.4 Organic (biological) properties

Unbottled drinking water must be totally free of any algae, fungi and insects and of their eggs, spores or parts as well of any protozoa, including amoeba.

5.5 Microbiological properties

- 5.5.1 Unbottled drinking water must be totally free of microbes causing diseases, fecal microbes and viruses detrimental to human health.

5.5.2 Treated water entering public distribution systems

Any 100 ml of the tested sample of water entering a public distribution system must be totally free of any *Escherichia coli* and thermophile coliform group bacteria.

5.5.3 Treated water in public distribution systems

- 5.5.3.1 Any 100 ml of the tested sample of water in a public distribution system must be totally free of any of the *Escherichia coli* and thermophile coliform group bacteria.

- 5.5.3.2 Any 100 ml of the tested sample of water in a public distribution system must be totally free of any bacteria from the coliform group. In case of major supply where a large number of samples are tested, 95% of samples tested in a year must be free of coliform bacteria.

**6. Sampling**

Samples shall be taken in accordance with the Gulf Standard referred to in Section 2.1.

**7. Examination and testing methods**

Samples taken in accordance with Section 6 shall be subject to all tests necessary to determine their conformity with this Standard.

- 7.1 Routine and non-routine microbiological tests shall be carried out in accordance with the Gulf Standard referred to in Sections 2.3 and 2.4
- 7.2 Biological tests shall be carried out in accordance with the Gulf Standard referred to in Section 2.2.
- 7.3 Chemical tests shall be carried out in accordance with the Gulf Standard referred to in Section 2.5.

(List of technical terms in Arabic and their English equivalents)

**References**

Guiding for drinking water quality  
Third Ed. Vol. 1  
Recommendations  
World Health Organization 2004